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### **Sociolinguistic variation of two-handed signs in French Belgian Sign Language: Weak drop as a stable reduction phenomenon**

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# Sociolinguistic variation of two-handed signs in French Belgian Sign Language (LSFB)

**WEAK DROP** as a stable reduction phenomenon

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Sign CAFÉ 1, University of Birmingham  
July 30-31 2018



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## Two-handed signs



*No WEAK DROP*



*WEAK DROP*

POSSIBLE

*There is a “growing observation across  
unrelated sign languages that a  
**phonological shift is occurring over  
time from  
two- to one-handed signs”.**  
(Stamp et al. 2015: 168)*

“

# Is there a change towards one-handed forms in LSFB?

- Looking at all two-handed signs of a given sign language
- Semi-automatic method of extraction of one-handed and two-handed forms
- In a yet understudied sign language





## Signing styles and phonetic reduction

*Towards a description of French Belgian Sign Language registers. Phonological aspects and phonetic variations (Paligot 2018)*

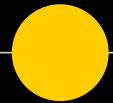
- Sign lowering
  - Weak Hand Lowering
  - Lowering of forehead located signs
- Weak Drop



Vers une description des registres de la langue des signes  
de Belgique francophone (LSFB)  
Aspects phonologiques et variations phonétiques

Thèse déposée par Aurore PALIGOT  
en vue de l'obtention du grade de  
Docteur en Langues et Lettres  
19 mars 2018

Jury : Laurence MEURANT (promotrice), Jean GIOT,  
Onno CRASBORN, Mieke VAN HERREWEGHE, Adam SCHEMBRI



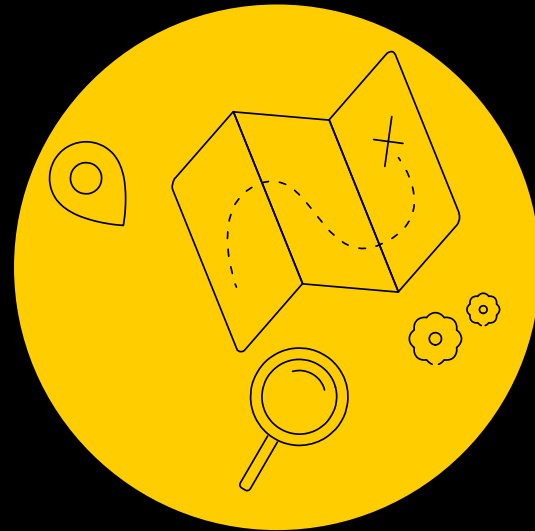
## French Belgian Sign Language (LSFB)

**Starting point** LSFB seems to be going through an accelerated development that includes the development of a **formal/informal register difference**

**Vocal Languages** Informal styles contain more reductions than formal styles (e.g. van Son & Pols 1999; Hanique et al. 2013, Ernestus et al. 2015)



# Background





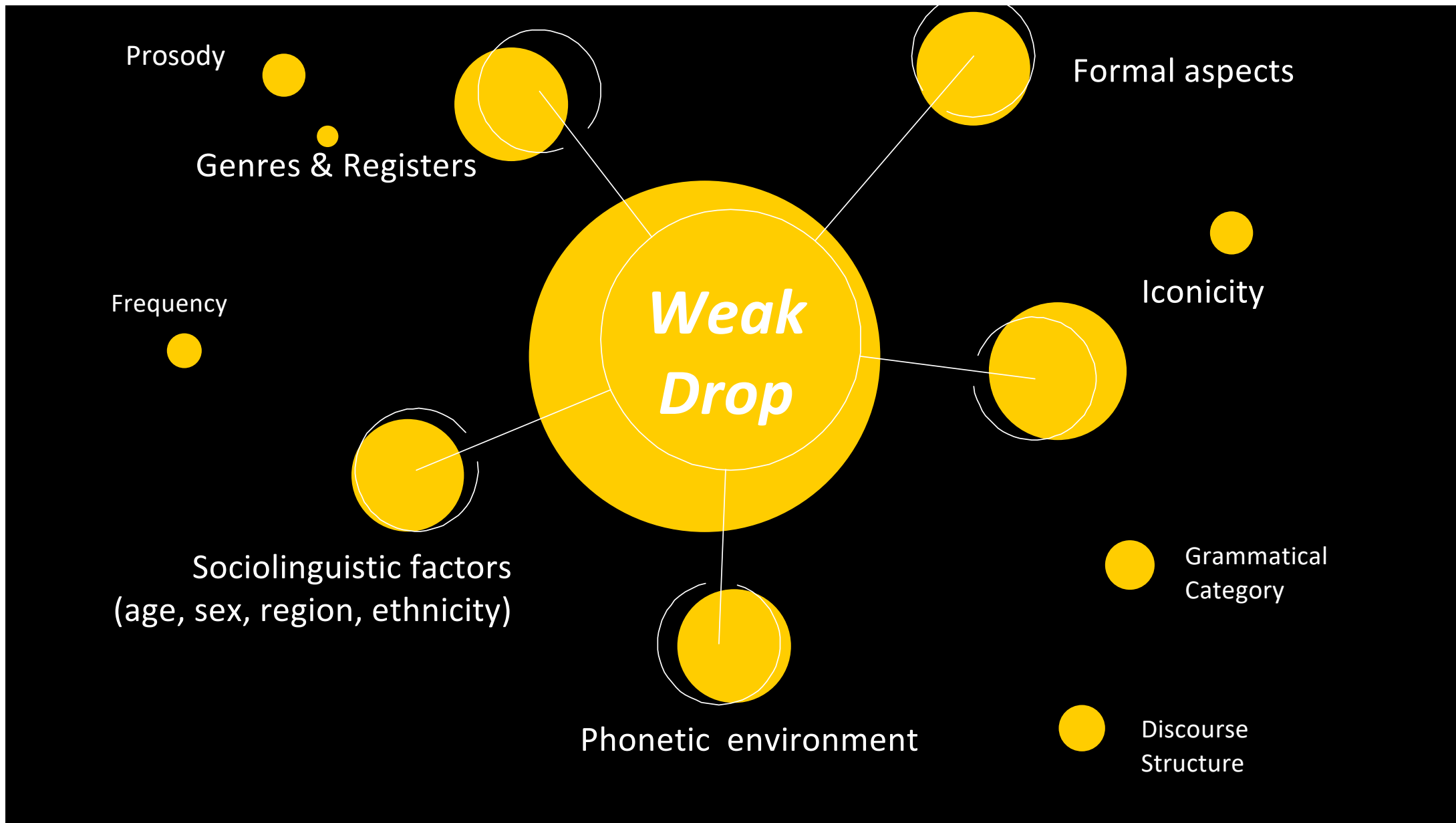


## Phonetic reductions

“**Phonetic reduction** occurs in the course of **normal language production**, when instead of producing a carefully articulated form of a word, the language user produces a **less clearly articulated form**.” (Tyrone & Mauk 2010)

1. Alterations
2. Deletions
3. Reductions of contrasts

14 - 20 % of reduced forms in conversational data (Warner 2011)



a

## Formal aspects

Weak Drop is linked to the amount of phonological information that is lost in the realisation of one-handed variants (Battison 1974; Brentari 1995; van der Kooij 2001; Paligot, van der Kooij & Crasborn to come)

Same amounts of Weak Drop in symmetrical and asymmetrical signs:

**Symmetrical signs**: Contact and alternating movement disfavors WD

**Asymmetrical signs**: Weak B handshape favours WD; contact disfavors WD

**b**

## Iconicity

When the signs refer to **concepts that involve two objects** or referents, Weak Drop is less likely to occur (Van der Kooij 2001, Paligot, Van der Kooij & Crasborn to come).

**Disfavour WD:** Body parts, two entities, outline

**Favour WD:** Figure-ground

Body parts



HANDICAP

Two entities



CONSIDER

Figure-Ground



READ

Outline



GROUP

## C

## Phonetic environment

Weak Drop is more likely to occur when a two-handed sign is surrounded by one-handed forms (Nishio 2009, Paligot et al. 2016).

1 hand



1 hand

1 hand



2 hands

2 hands



1 hand

2 hands



2 hands



## Sociolinguistic factors

### Phonological change

Frishberg (1975)

OLSF, ASL, head signs

Lucas et al. (2007)

(A)ASL, Type 1 signs

McCaskill et al. (2011)

AASL, Type 1 signs

McKee et al. (2011)

NZSL, Numeral signs

Stamp et al. (2015)

BSL, Numeral signs

## e

## Genre and registers

Weak Drop is thought to be more common in informal and spontaneous registers (ex. Battison 1974, van der Kooij 2001, McCaskill et al. 2011), but there is no strong evidence to support that claim to date.

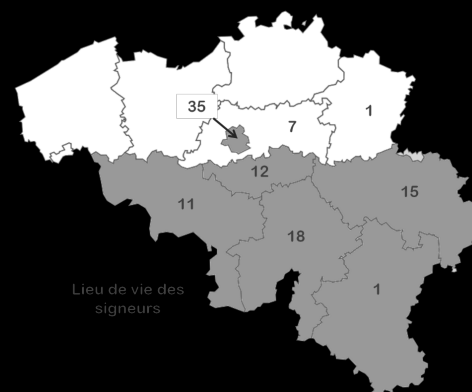
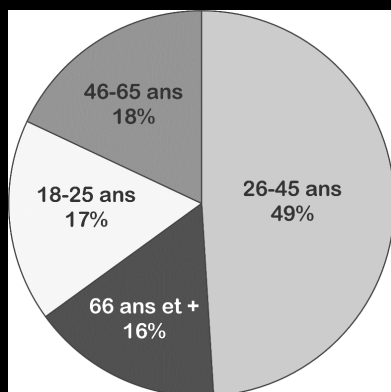
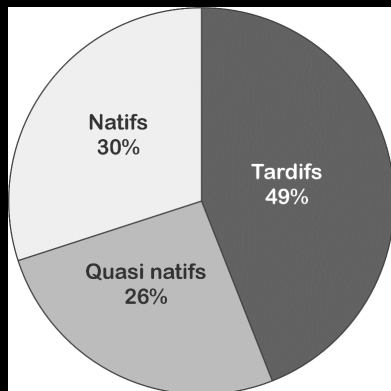
In vocal languages, informal styles often contain more reductions than formal styles (e.g. van So vn & Pols 1999; Hanique et al. 2013, Ernestus et al. 2015).

Those associations are context-dependent and sociologically determined (Laks 2000).

# Study







**Corpus LSFB (Meurant 2015)**  
[www.corpus-lsfb.be](http://www.corpus-lsfb.be)

# 12 hours

of annotated videos

# 2 816 signs

stored in Lex-LSFB

# 76 764 tokens

of standard signs

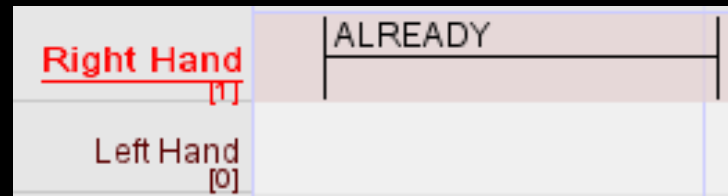
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*Corpus LSFB (Meurant 2015)*

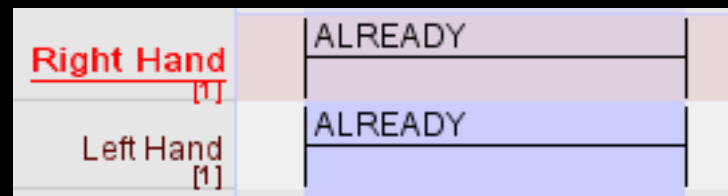
*[www.corpus-lsfb.be](http://www.corpus-lsfb.be)*



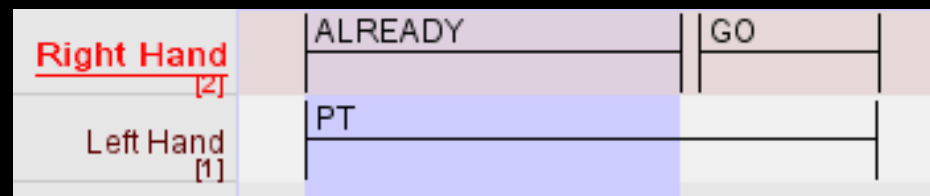
## Method



Weak Drop



No Weak Drop



## Aurore Paligot, Maxime Gobert, Laurence Meurant

Aurore Paligot, Maxime Gobert, Laurence Meurant

<sup>21</sup> "Determining the number of signs" in a corpus is a "non-"

01 | "Determining the number of signs" in a corpus is a "non-trivial task" given that "signers may deviate from citation forms by articulating one-handed signs as two-handed and vice versa, use their non-dominant hands as a buoy, or articulate two one-handed signs simultaneously" Bank (2014 :73)

02 | “Gloss pattern matching (i.e., a query such as ‘is the same, different or empty/absent annotation found on a ‘sister’ of a given tier, e.g., the LH tier compared to the RH tier”) is not implemented in the search functions of Elan yet (Johnston 2016), which makes point 1 even more difficult to achieve.

03 We perform a gross pattern matching as described in point 2 with either **Excel** or **SQL** to identify which pattern of articulation corresponds to every annotation. This information, crossed with data about the handedness status of the citation forms (one-handed or two-handed signs) allows us to determine the frequency of occurrence of each sign as well as its articulatory pattern.

Pattern of articulation	Description	Compared tier
One-handed articulations	A manual activity performed with one hand	No annotation on the compared tier
Two-handed articulations	Same manual activity for the two hands	Identical annotation on the compared tier
Complex articulations	Different manual activity for each hand	Different annotation on the compared tier

**One-handed articulations**

**Two-handed articulations**

**Complex articulations**

This method is replicable for any annotation dataset that draws on the principles of ID-glossing (Johnston 2016), has two independent annotation tiers for the hands and does not segment the buoys as separate annotations (Crasborn et al. 2015).

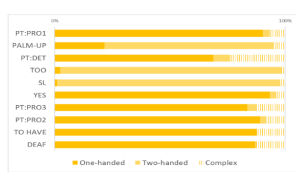
The screenshot shows the SQL interface with a table of data and a video feed. The table has columns: ID, Name, Age, Gender, Height, Weight, BMI, Blood Pressure, Heart Rate, and Glucose. The video feed shows a person standing in front of a green screen. The interface includes a search bar, a table view, and a video feed. The video feed is labeled 'SOON'.

Import the data from Elan  
with the function  
"Annotation overlaps  
information"

### Advantages

Rank	ID-phrases	Handedness	Frequency	PH
1	PT-PROJ	one-handed	4,564	100%
2	PALM-UP	two-handed	2,104	100%
3	PT-DET	one-handed	2,068	100%
4	TOO	two-handed	1,813	100%
5	SL	two-handed	1,680	100%
6	YES	one-handed	1,236	100%
7	PT-PROJ	one-handed	1,099	100%
8	PT-PROJ	one-handed	1,046	100%
9	TO HAVE	one-handed	852	100%
10	DEAF	one-handed	829	100%

■ One-handed 
 ■ Two-handed 
 ■ Complex



The method provides accurate information about the sign frequency and allows

- (-1) To tackle the difficulties of point 1 and 2
- (-2) To process large amounts of data
- (-3) To revise prior information about handedness based on usage data (Johnston 2016)
- (-4) To avoid manual annotation of one-handed and two-handed variants (Johnston 2016)

It can automatically spot Weak Drops, buoys and complex articulations

It can be further refined by implementing constraints based on overlap times and by applying a by-ID-gloss filter (i.e. in the case of one-handed sings).

- Correction of the accuracy of the frequency counts of the Corpus LSFB (Paligot 2018)
- Quantitative studies of Weak Drop in NGT (Paligot, van der Kooij & Crasborn to come) and LSFB (Paligot 2018)

Frequency being a rising topic in SL literature (e.g. Fenlon et al. 2014, Börstell et al. 2016), we call for an evaluation of the current counting methods in order to formulate some propositions of standardization in this respect.

Bank, R. (2014). The Ubiquity of meanings in NGT: A corpus study. Utrecht: LOT.

Berstell, C., Hørgberg, T., & Ostling, R. (2016). Distribution and duration of signs and parts of speech in Swedish Sign Language. *Signs (Linguistics)*, 19(2), 143–196.

Crabson, D., Bank, R., & Cormier, K. (2015). Digging into Sign: Towards a gloss annotation standard for sign language corpora. Fæstlin, J., Schencki, A., Rentel, R., Vinson, D., & Cormier, K. (2014). Using conversational data to determine lexical frequency in British Sign Language. *Lingua*, 143, 187–202.

Johanson, T. (2016). *Austrian Corpus Annotation Guidelines*. Mearant, L. (2015). *Corpus LSFb: Un corpus interactif en libre accès de vidéos et d'annotations de la langue des signes de Belgique francophone* (LFSB). Université de Namur. <http://www.corpus-lsfb.be/>.

Paillat, A. (2018). *Vers une description des registres de la LSFb: Aspects phonologiques et sociolinguistiques*. PhD Thesis, Université de Namur.

Bank, R. (2014). The Ubiquity of meanings in NGT: A corpus study. Utrecht: LOT.

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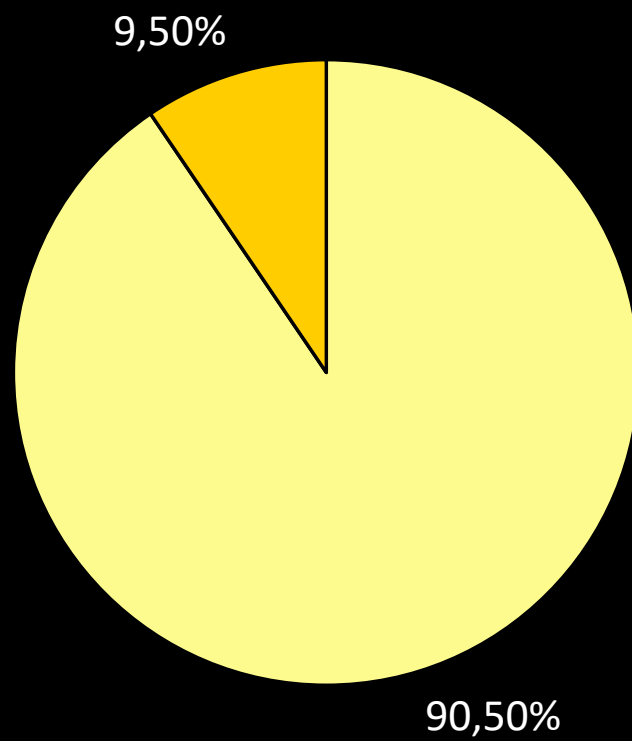
Jehonnet, T. (2016). *Auxiliary Corpus Annotation Guidelines*. Mouton, L. (2015). *Corpus LSF: Un corpus interactif en libre accès de vidéos et d'annotations de la langue des signes de Belgique francophone* (LSPB). Université de Namur. <http://www.corpus-lsf.be/>.

Paillat, A. (2018). *Vers une description des registres de la LSF: Aspects phonologiques et sociolinguistiques*. PhD Thesis, Université de Namur.

We warmly thank Alysson Lepeut for her help and the reviewers for their useful comments.

- Fully automatized in SQL
- Sign frequency
- Patterns of articulations

➔ No need to manually annotate  
one-handed and two-handed variants anymore!  
(Johnston 2016)



- Two-handed & complex forms
- One-handed forms

**Weak Drop in the  
Corpus LSFB**



## Weak drop in the Corpus LSFB

### Genres

1. Narration (-)
2. Description
3. Argumentation
4. Explanation
5. Conversation (+)

### Preparedness

Prepared (-) vs. unprepared (+)

### Interactivity

Interactive vs. non interactive

### Signers' profiles

1. Sex (men (+), women(-))
2. Age (18-25, 26-45, 46-65, 66+)
3. Acquisition (native, near-native, late)

### Frequency

Very frequent signs (+) vs.  
Less frequent signs (-)

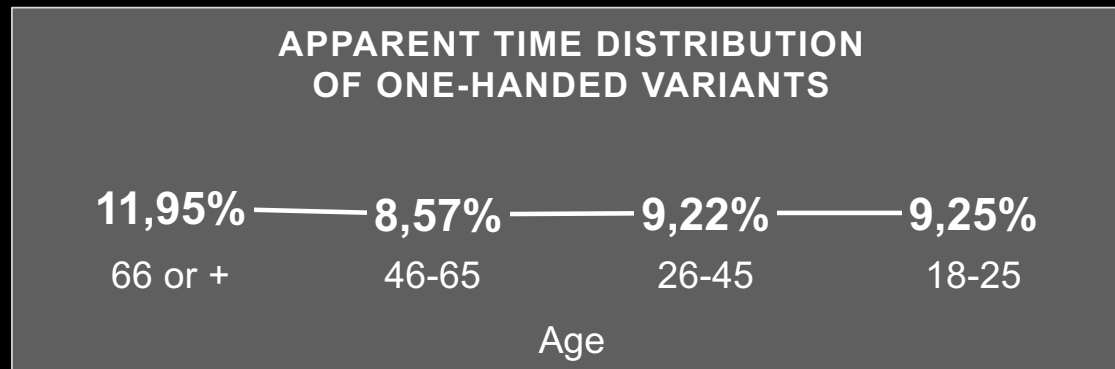
Mixed effect model  
(lme4; Winter 2013)



## Apparent time construct

« The basic assumption underlying apparent time [...] is that differences among generations of adults mirror actual diachronic developments in a language when other factors [...] are held constant. » (Bailey et al. 1991)

- Apparent time vs. real time
- Change in progress vs. stable variation



# Conclusions





## 1. Weak Drop is more frequent in informal, spontaneous registers

First study to actually measure it!

The one-handed form is less careful than the two-handed form

Women tend to favor the two-handed forms because of their sensitivity to linguistic prestige (cfr Labov 1960)

We observe cross-linguistic differences (ASL and AASL, McCaskill et al 2011)

## 2. Variation of one-handed and two-handed forms is a stable phenomenon in LSFB

According to the apparent time hypothesis (Bailey 2002), a variation within different age groups may be read as an ongoing language change.

No difference between the generations of signers was observed.

=> No change towards one-handed forms in LSFB

The argument is strengthened by the men's preference for the reduced forms. This was shown to be an indicator of stable variation pattern in several vocal languages (Labov 1990).

We observe cross-linguistic differences (ASL, AASL, BSL, NZSL, Auslan)



## Notes!

### **Cross linguistic differences: change**

In LSFB, stable phenomenon vs. evolutive phenomenon in ASL (Lucas et al. 2001); AASL (McCaskill et al. 2011); NZSL (McKee et al 2011); BSL (Stamp et al. 2015) in sub-groups of signs.

### **Cross linguistic differences : value**

In LSFB, WD=informal vs. in AASL, two-handed form= street language (McCaskill et al. 2011).

### **Further comparison between global and local variation phenomena**

All two-handed signs vs. sub-groups of two-handed signs (ex. head signs in ASL and LSFB)



## Contacts

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## Corpus

[www.corpus-lsfb.be](http://www.corpus-lsfb.be)

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Registres de langue – Variable d'application : articulations à une main

<i>Groupe de facteurs</i>	<i>Facteur</i>	<i>Facteur de pondération Rbrul</i>	<i>Pourcentage d'articulations à une main</i>	<i>Nombre d'occurrences</i>
Spontanéité	Semi-spontané	0.537	9,84%	25 403
	Planifié	0.463	8,14%	8 083
Genre discursif	Explication	0.536	10,21%	7 015
	Conversation	0.519	8,95%	9 303
	Argumentation	0.496	8,78%	8 640
	Description	0.49	12,15%	1 646
	Narration	0.46	9,44%	6 882
Interactivité	Interactif	/	9,16%	20 551
	Semi-interactif	/	9,86%	12.35

# **Données sociolinguistiques – Variable d’application : articulations à une main**

<i>Groupe de facteurs</i>	<i>Facteur</i>	<i>Poids Rbrul</i>	<i>Pourcentage d’articulation à une main</i>	<i>Nombre de tokens pour le groupe de facteurs</i>
Sexe	Masculin	0.557	10,47%	18 221
	Féminin	0.443	8,19%	15 265
Age	18-25 ans	/	9,25%	5 966
	26-45 ans	/	9,22%	22 032
	46-65 ans	/	8,57%	2 391
	66 ans ou +	/	11,95%	3 097
Profil d’acquisition	Natif	/	10,00%	13 466
	Quasi-natif	/	9,13%	10 814
	Tardif	/	8,95%	9. 206